

Letter to the Editor

## Natura abhorret a vacuo. Future perspectives of autologous fibrin glue. Is it time for reappraisal?

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We have read and appreciated the new technique presented by Di Vitantonio *et al.* in the article Dural repair using autologous fat: Our experience and review of the literature. *Surg Neurol Int* 2016 Jul 7;7(Suppl 16):S463-8. Neurosurgery is a unique type of surgery in which we have to face difficult and articulate reconstructions; the greater the procedure is, the harder the reconstructive techniques are, and often the results are arduous to obtain. Therefore, the search of newer devices and materials is strongly encouraged, and it seems to progress daily with new achievements. Regarding the progress of reconstructing dura mater and even fill the larger defects, we were fascinated by the proposed technique of engrafting autologous abdominal fat to ensure the water tight closure of the dura and to fill the dead space during cranial procedures, rather than using dural substitutes.<sup>[1]</sup>

The described procedure aroused great interest in our surgical team because of its easiness to be performed, its versatility, and its potential fields of use, however, we wonder about the profile of adverse events that were reported. Even if the grafting of autologous fat is quite diffused in many fields and is a relatively old practice, Di Vitantonio reported few cases of abdominal hemorrhage, fat necrosis, cerebral hemorrhage, hydrocephalus, and different cases of cerebrospinal fluid (CSF) leakage in their series. Although the incidence of adverse events was reported in only a little percentage of their patients, some considerations about this technique could be done.

During their practice, a neurosurgeon often encounters dural lacerations or CSF leakage, which need a proper duroplasty, both in cranial and vertebrospinal procedures. Even during intracranial and encephalic procedures, we have to face the need of an accurate hemostasis and a watertight dural closure to protect neural structures. This is usually achieved by the use of dural substitutes and different types of biological glues and dural sealants; such

practices implicate the implant of foreign bodies even if they are biocompatible. Therefore, daily-employed foreign devices clash with the ideal type of clean surgery to take whatever it needs from the patient himself, maximizing biocompatibility, surgical versatility, and reducing costs and devices requirement; however, do not expose patients to the adverse events reported with the harvesting and implanting of fat grafts.

In our daily practice, we employ different devices to ensure dural closure and its reparation. Patches of collagen-sponge, leaves of absorbable oxidized cellulose, or pieces of gelatin sponge are routinely used, alone or in combination, to ensure the better achievable reparation and a solid plasty both in spinal and in cranial-encephalic surgery. To improve their grip, a thin layer of fibrin glue may be sprayed to ensure the seal of the reparation. This solution is commonly used in neurosurgical practice to repair dural defect and even prevent the bleeding and CSF leakage.<sup>[2]</sup>

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Moreover, fibrin glue alone or in combination with the abovementioned variety of hemostatic and reconstructive devices makes possible the seal of even the toughest duroplasties to be shaped by being sprayed directly into the surgical field. Last, but not the least, its viscous consistency makes fibrin glue fill the surgical empty space, even if temporarily, and avoid even the smallest unwanted defect.

In our surgical unit, we currently use an autologous fibrin sealant (Vivostat®), made characteristically from the patient's own blood, that does not contain any foreign or exogenous agents. Vivostat® has demonstrated great versatility and good strength in several procedures; in fact, it shows good capability in polymerization, good elasticity, and adhesive properties owing to its greater biocompatibility.<sup>[3-5]</sup>

Even if the use of fibrin glue would seem outdated and so routine to not encourage further investigations in this regard, the use of autologous fibrin should perhaps have unexpected potentials and new fields of possible applications, beyond its well-known hemostatic and sealant properties. In this respect, we recently reported an unexpected case of spinal fusion, supposedly promoted by the use of autologous fibrin glue;<sup>[6]</sup> this has paved the way for sharp hypotheses and disquisitions about the unexplored potentialities and the current role of fibrin glue in neurosurgery. Thus, we believe that the use of autologous fibrin would encourage new questions about its biological effects and its possible field of employment; in our opinion, further investigations should be done. In conclusion, Di Vitantonio's technique of fat engraftment to repair dural defects in cranial surgery is an interesting

solution for repairing large defects and dead space and could be suitable for spinal surgery also, avoiding the use of foreign agents and synthetic devices.

However, along with the added risks linked to that procedure, enhanced by the harvesting of abdominal fat and its engrafting, is it worth perhaps to reevaluate the use of autologous fibrin with dural substitutes during common neurosurgical procedures?

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### Conflicts of interest

There are no conflicts of interest.

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